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Effects on Producers of the Transition to Revenue-Based Federal Crop Insurance Programs

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EFFECTS ON PRODUCERS OF THE TRANSITION TO REVENUE-BASED FEDERAL CROP INSURANCE PROGRAMS

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Abstract

Prior to the passage of each farm bill, there is much debate regarding the programs contained within it. One of these programs is federal crop insurance, which underwent a major shift in the mid-1990's with the introduction of revenue-based crop insurance rather than yield-based. Revenue-based programs provide insurance of a certain revenue level, rather than a certain yield level, which contributed to their popularity among producers. These revenue-based programs have become a key component of federal crop insurance. From 2014 to 2018, the costs of federal crop insurance were approximately $41 billion, much of this a result of subsidized insurance premiums. Thus, there is much debate as to the benefits to producers justifying the costs. To research the benefits producers receive from these programs, a literature review was conducted drawing from various sources in order to summarize research as to the efficacy of these programs.

Keywords: Agricultural economics, crop insurance, farm bills, US farm policy

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I. Introduction

The highest level of agricultural policy in the United States stems from what is known as the farm bill – a law that typically expires after four years with its twelve titles encompassing a wide range of policies, such as: commodity programs, conservation programs, trade, and nutrition (Johnson & Monke, 2017). As the 2014 farm bill expires in 2018, changes to federal agricultural policy have entered the political discussion, including debate on Title XI of the 2014 farm bill, federal crop insurance. As is typical in policy discussions, costs and benefits must be evaluated, and according to Johnson & Monke the costs of federal crop insurance increased by 11% each year from 2008 to 2014 (2017). In the mid 1990's, subsidized revenue-based crop insurance programs were introduced, and their popularity surged and are still much more widespread than their yield-based counterparts (Glauber, 2013). This begs the question as to the efficacy of revenue-based crop insurance with regards to producers' benefits, and whether or not these benefits have merited the $41 billion in costs over the course of the 2014 farm bill (Johnson & Monke, 2017).

II. Federal Crop Insurance Background

Prior to the passage of the Agricultural Adjustment Act of 1933 (AAA), most United States federal farm policy was designed to indirectly assist farmers, notably the Homestead of Act of 1862 which granted 160 acres to any individual who settled on and improved these acres for 5 years. Other policies included the establishment of land-

grant colleges such as the University of Nebraska, experiment stations, the extension service, and the United States Department of Agriculture. (Kramer, 1983). Following several occasions of severe price depressions within a decade, government policy shifted toward a more direct approach, beginning with the establishment of the Commodity Credit Corporation (CCC) in 1933. The CCC is a government corporation that functions as a lender for the USDA's price support programs (Womach, 2005). It also has the authority to buy, sell, lend, make payments, and engage in activities to ensure production and stable prices for United States farmers (Womach, 2005). These programs are carried out through the Farm Service Agency, or FSA.

Severe droughts in 1934 and 1936 created enough public and government interest in a more "interventionist" approach to commodity markets, which became presidential campaign issues in President's Roosevelt's second presidential election (Kramer, 1983). Shortly before the 1936 election, Roosevelt established the President's Committee on Crop Insurance, which created one of the earliest forms of federal crop insurance in the United States. This program only covered wheat and did not insure against the possibility that prices would fall. The United States Department of Agriculture was to oversee the program; policies were to be sold by local committees and boards of directors. Finally, it was recommended that premiums be calculated as they would for any other insurance policy (by considering the probability of yield losses), while farmers would be insured for a percentage of their typical production (Kramer, 1983). A 1938 bill that created the Federal Crop Insurance Corporation, or FCIC, is also considered to be the first farm bill. "Farm bill" began as an informal term for omnibus

laws, typically passed every five years, containing commodity and farm supports. Since 1973, these have been officially referred to as Farm Bills (Womach, 2005).

In 1980, still only half of US counties and 26 crops were covered by federal crop insurance, which was primarily Multi-Peril Crop Insurance or MPCI (Glauber, 2013). Multi-peril crop insurance protects against “natural perils” such as hail, high winds, insects, or fires (Womach, 2005). With the passage of the Federal Crop Insurance Act of 1980, crop insurance programs were widely expanded to cover a greater area of the US and more crops (Shields, 2015). According to Glauber (2013), the 1980 law was passed with the intention to shift producer’s risk management focus to catastrophic (total loss) protection in order to increase participation in the program. It had three components. First, premiums were subsidized to promote participation. Before the 1980 law, farmers had to pay the full premium, whereas they now had to pay 70%. Second, standing disaster programs were discontinued in counties where crop insurance was made available. Third, rather than the USDA either directly managing individual policies, or contracting with a private agent to do so, crop insurance would now be handled by private companies (Glauber, 2013). According to Glauber, Congress reasoned that in order to increase participation, a more “active” sales force was required. These companies would be reimbursed for operating expenses but would also receive a share in profits (or suffer from the result of losses). However, the 1980 bill did not result in the expected increases in participation. A 1986 study by Gardner and Kramer found that premiums may have to be subsidized 50% to get 50% of farmers to participate (Glauber, 2013).

The Crop Insurance Reform Act of 1994 once again altered federal crop insurance by requiring farmers to participate in the crop insurance program to be eligible for participation in price support programs (Glauber, 2013). Specifically, they were required to participate in catastrophic risk protection (CAT). CAT compensates growers for yield losses over 50% of their average historical yield at a rate of 55% of the average market price. Farmers were also given the option to "buy-up" additional coverage but must cover the buy-up cost. Otherwise, the Crop Insurance Reform Act fully subsidized basic CAT coverage by the federal government, and farmers would simply have to pay $50 per crop per county (Womach, 2005). By 1995, approximately 220 million acres were enrolled in the program, which was about 80% of eligible acres at the time. In 1996, the CAT purchase requirement for price support was eliminated, reducing enrollment – though purchases of additional coverage continued to increase, with the passage of the 2000 bill, participation rates seemed to have steadied at around 80% (Glauber, 2013).

Congress continued to make attempts to incentivize farmers to enroll in the program, passing the Agricultural Risk Protection Act in 2000 (Glauber, 2013). This law once again increased subsidy levels, and enrollment once again increased to over 265 million acres (it had decreased to about 182 million acres following the removal of fully subsidized payments in 1996). As Glauber notes in his 2013 study *The Growth of the Federal Crop Insurance Program*, there was a clear correlation between the rate of enrollment and level of subsidization of premiums.

While in 1990, all policies offered by the FCIC were yield-based, revenue policies were introduced in the mid-1990's. Rather than using a yield average and calculating producers' losses based on a certain set crop price, payments would be calculated using revenue losses. In 1993, the FCIC began offering an area yield group insurance pilot program known as the Group Risk Plan (GRP) to soybean producers. Group risk plans differ from individual policies in that indemnities are paid on a county-wide loss basis. For example, if an entire county experienced below average production, all farmers participating in the group risk plan would receive payment (Womach, 2005). The following year, President Clinton indicated his support for GRP in the federal budget, and congress expanded the program essentially nationwide (Glauber, 2013). Another group program created in 1999 was an area-based revenue insurance plan, known as the Group Revenue Insurance Program, or GRIP (Glauber, 2013). GRIP was available at limited levels where GRP was also available (Womach, 2005). Area-based insurance plans pay indemnities when either yield (in the case of GRP) or revenue (in the case of GRIP) drops below a certain "trigger" level (Paulson & Babcock, 2007).

III. Present-Day US Crop Insurance Programs

In 2013, the USDA Risk Management Service replaced group insurance plans with Area Risk Protection Insurance, or ARPI (USDA, 2013). The agency's reasoning behind this change was to increase efficiency of federal crop insurance at the administrative level by consolidating the different insurance plans offered into a system with uniform pricing and policy provisions, thereby reducing costs. Area Risk Protection Insurance also includes an optional component for revenue-based insurance policies

known as the Harvest Price Option, or HPO. The harvest price option allows farmers to set a revenue level based on early season or pre-plant prices, but if the price of the insured crop improves by harvest time they can opt to set their revenue level (and thus indemnity payments) at the harvest price instead. In an assessment of the HPO, researchers at the University of Illinois found that 91.6% of corn producers, 91.2% of soybean producers, and 87.2% of rice producers opted for revenue protection with the harvest price option, and only 0.6%, 0.6%, and 0.4%, respectively opted for risk protection with the harvest price exclusion (Zulauf, Schnitkey, Coppess, Paulson, 2017). The remaining acres were insured by yield protection. It is not difficult to understand the immense popularity of the HPO program, given that it is an extra tool to eliminate risk.

While the federal crop insurance has undergone many changes since its inception in the 1930's, according to Serra, Goodwin, and Featherstone one of its most significant changes occurred with the introduction of revenue-based crop insurance programs in the 1990's (2003). At this time the federal crop insurance program was considered by some, such as Harrington & Doering, to no longer be meeting the needs of producers (1993). The goal of federal crop insurance programs has also remained largely the same: to protect producers from severe financial loss and bankruptcy, while ensuring a steady supply of the crops they produce. Since their introduction, however, revenue-based instruments such as have rapidly increased in popularity. Rather than only receiving support when yields are low, producers can also receive revenue support when prices are low (Dismukes, 2002).

Some of the new insurance products introduced in the mid and late 1990's include crop revenue coverage (CRC), Revenue Assurance (RA), and Income Protection (IP) products (Serra et al., 2003). Crop revenue coverage provides insurance against low yields, low prices, or both. Revenue assurance is similar to CRC in that it is designed to protect producers from both yield losses and price losses. However rather than using a nationally set price, farmers can opt to use a set county income level that may more closely account for variables such as local input prices (Womach, 2005). Income protection differs from CRC in that the farmer themselves selects their target revenue level. CRC programs have generally been the most widely available as well as the most popular form of revenue-based policies (Dismukes, 2002). CRC policies have a set revenue level at which indemnities are paid either as a result of crop or price losses (or a combination of both). However, they differ from other revenue programs in that producers can select either the market or planting price as the "target" level of revenue, which has likely influenced the popularity this particular program (Dismukes, 2002). Paulson & Babcock also note that these programs have raised questions as to their classification as farm bill commodity programs or crop insurance programs. These are differentiated in that farm bill programs are funded at limited to no administrative cost to producers, while crop insurance commodity programs require that producers pay some of these administrative fees (2007).

With the introduction of revenue-based crop insurance policies came many studies of their ability and means of continuing to provide the financial support producers required, such as a 1995 study conducted by Goodwin and Smith. According

to this study on the economic implications of crop insurance, there were several early proposals for revenue programs occurring in the political sphere as to how to increase participation in federal crop insurance programs. These include a 1993 proposal by Harrington and Doering, as well as the “Iowa Revenue Insurance Plan” put forth in a 1995 farm bill study (Goodwin and Smith). They proposed a system in which MPCI would remain in addition to price insurance which would pay indemnities when prices fell below a certain trigger. The Iowa Revenue Assurance Plan was proposed in 1995 following a study sponsored by the Iowa Farm groups. It entailed the consolidation of all price, insurance, and disaster relief programs into a single program. This revenue assurance program would guarantee farmers 70% of typical revenues (Goodwin & Smith). In their assessment of these proposals, Goodwin and Smith note that the Iowa Plan included a provision many economists had been in support of for years: the decoupling of farm programs (1995). Decoupling refers to the separation of federal payments (in any form) from the requirement that specific crops be produced, or a specific land use be implemented. It removes what economists and producers alike viewed as a contradiction: farmers were to reduce production to reduce oversupply but were also encouraged to increase production because benefits were connected to output (Womach, 2005). With the 2002 Farm Bill, direct payments were decoupled from production and prices. Other proposals noted in Goodwin & Smith’s study included cost-of-production insurance, whole farm Insurance, and rainfall Insurance (1995). Cost-of-production insurance is similar to the basic concept of revenue insurance, but with costs of production being used to calculate target revenue levels instead of expected income

from crop production. Whole farm insurance policies insure farms as a whole rather than individual crops. Atwood & Watts note in a 1994 study that because exogenous conditions such as weather and markets affect different crops in varied ways, insurance companies could more accurately price premiums and calculate indemnities. Finally, the rainfall insurance concept was developed after policies created, though not implemented, in Australia. In essence, rather than triggering at certain price or farm revenue levels, payments are triggered below certain rainfall levels.

As of 2014, 294 million acres are covered by federal crop insurance programs, with corn, wheat, soybeans, and cotton making up approximately 70% of these acres (Shields, 2015). The differences between the federal crop insurance program and farm commodity support program should also be noted. The federal crop insurance program, through the FCIC, provides various insurance programs which cover over 130 different crops grown across the United States. The farm commodity support program provides price and income supports for a smaller number of crops, including corn, wheat, rice, and peanuts (Shields, 2015).

The current crop insurance policies offered by the federal government are entirely sold and serviced through private insurance companies (Coble & Barnett, 2012). The agreement between the USDA and these companies is known as the standard reinsurance agreement, or SRA (Womach, 2005). This agreement establishes terms and conditions under which the federal government provides subsidies and reinsurance, or insurance for an insurance company. These private companies share in the risk of underwriting crop insurance policies with the federal government, an

approximately $45 billion liability (Coble, Dismukes, Glauber, 2007). As of 2014, crop insurance premiums are subsidized at an average rate of 62% (Shields, 2015). There are currently 18 private companies through which policies are sold and serviced. Shields notes that while the companies' losses are covered by the USDA, their administrative and operating costs are covered by the federal government. According to the CRS, the four crops accounting for 70% of planted acres – corn, cotton, soybeans, and wheat – also had high levels of coverage among planted acres. 83% plantings of corn were covered; 91%, 84%, and 86% of cotton, soybeans, and wheat, respectively, were covered (Shields, 2015).

IV. Analysis

Over eighty years after its introduction, federal crop insurance remains a consistent topic of discussion in farm policy in the United States. Thus, with the debate of each farm bill comes debate on the efficacy of federal crop insurance. At various points in its existence, the program has fallen under criticism. In particular, criticism typically stems from the possibility that the program encourages excessive moral hazard – leading producers to increase their risk in production choices. In the 1970's, critics found that the program was too expensive and that it encouraged farmers to produce on marginal land, driving up the insurance costs (Glauber & Collins, 2002).

Aside from the issues raised regarding the cost-effectiveness, a key question in the crop insurance debate is to whether it has fulfilled its original goals of shielding producers from unpredictable losses, particularly with recent changes to the program, such as the addition of revenue-based crop insurance and its replacement of yield-

based programs as by far the most common insurance program. As the most recent significant change to occur, farm profitability and overall financial health following the introduction of revenue-based programs will be examined in order to determine the programs efficacy, and whether or not the introduction of the new revenue-based programs have disadvantaged agricultural producers over yield-based programs. Because there are myriad ways to determine the results of the change to revenue-based crop insurance, a literature review was performed in order to synthesize research on crop insurance in the United States since revenue-based programs became popular.

V. Literature Review

In response to the introduction of revenue-based policies in the mid-1990s, in 2000 a group of researchers studied their affect (as well as the effects of yield policies), on producers' decisions in the futures market. Due to crop insurance's implications regarding production risks, Coble, Heifner, and Zuniga (2000) investigated how the new revenue products affected and would continue to affect demand in the futures and options markets. The futures and options markets had long been used as a means to manage risk, and Coble et al. argued that this added an entirely new dimension to the best practices farmers should now utilize when hedging (2000). They developed models of all revenue-based insurance offerings and used models of "representative farms" to test the insurance models. The representative farms were created using statistics from Iroquois County Illinois, Douglas County Kansas, Lincoln County Nebraska, and Pitt County North Carolina. These counties were selected in order to closely represent real-world yield variations and price correlations (Coble et al., 2000).

In their conclusion, Coble et al. reveal that the introduction of the new revenue-based insurance policies changed the context in which farmers determine how to hedge when marketing their crops (2000). However, this is not surprising given that insurance products of all types are considered tools of risk management and opting for one risk management tool affects an individual's decision-making process in selecting another tool. This study found that revenue-based insure products tend to reduce demand for hedging when compared to an equivalent yield-based product, though by an amount less than 10%. In addition, research showed that Crop Revenue Coverage and Market Value Protection (a type of product offered privately at that time) tended to "complement" hedging more so than other revenue products. Essentially, they found that revenue-based insurance products led to a larger reduction in use of other risk reducing methods (such as use of futures) when compared to yield-based revenue products. In a similar study conducted in 2002, Wang, Makus, and Chen created a similar model to that of Coble, Heifner, and Zuniga in order to determine how adding revenue-based insurance products as a risk management option affects usage of hedging. While the 2000 Coble et al. study focused more on crops grown in the Midwest and on the east coast, the 2002 Wang et al. study investigated the insurance products' effects in the Pacific Northwest. However, they also found that Crop Revenue Coverage combined with other government payments as well as futures to be the optimum risk management combination for farmers.

In 2004 Gray, Boehlje, Gloy, and Slinsky analyzed federal crop insurance efficacy by looking at how the program can affect returns to land. Income can be put

back into the farm operation in two different ways: by increasing the expected returns to the farm or by altering the distribution of returns to the farm. Gray et al. also noted that the effects of any one risk mitigation program may be limited when combined with others (Gray et al., 2004). policies examined by the group were the Agricultural Market Transaction Act (AMTA) contract payments, the Marketing Loan Program (MLP), and Market Loss Assistance (MLA), as well as the federal crop insurance programs. All were researched in their form presented in the 1996 farm bill. The AMTA policies were eliminated with the 2002 farm bill and replaced with a newer payment program (Womach, 2005). The Marketing Loan Program allows producers to borrow against their production, so they do not have to sell when prices are low so that they can wait for higher prices. Market Loss Assistance was a program enacted from 1998 to 2001 that was essentially disaster payments passed as an emergency measure by congress for those years (Gray et al., 2004).

In their study, Gray et al. used a typical Indiana corn and soybean farm as the basis for a model with variable price risk, yield risk, income risk, corn and soybean prices, corn and soybean yields, and farm income. Distributions of the model were designed to closely model real-world conditions (such as avoiding negative prices). Two thousand iterations of the model were run for each of 2 scenarios. Under scenario 1, MLP and AMTA programs were applied to the simulated market conditions. Under scenario 2, MLP and AMTA were once again used with the addition of Crop Revenue Coverage (CRC) Insurance. The researchers assumed a 75% coverage level for the crop insurance. Their findings revealed that when Crop Revenue Coverage was

included with other common assistance programs, the mean “returns to land” and variability slightly decreased. (Gray et al., 2004). The researchers also found that CRC had a positive effect when combined with non-insurance support programs. Overall, Gray et al. concluded that farm program payments increase expected returns, thus moderating risk and leading land owners to command higher rents for producers. This directly contradicts one of the missions of the 1996 farm bill which was to allow farmers to more effectively interpret market signals. The second implication was that by providing large farm program payments ($24 billion in 2000), the risk-reducing benefits of federal crop insurance such as CRC were reduced. The government spent $8.2 billion on crop insurance subsidies from 1996-2002. They stated that their research suggested that such a level of subsidized federal crop insurance was necessitated by the $24 billion spent on other farm programs, thus reducing the value of crop insurance from the farmer’s perspective and increasing the level of premium subsidies required for participation to be maintained at a desirable level (Gray et al., 2004).

While many of the studies performed on the effects of revenue-based crop insurance programs considered only a single crop, most farmers grow two or more crops (Woodard et al., 2010). Researchers at Texas A&M University and the University of Illinois Urbana-Champaign saw a gap in research and examined the possibility that in a multi-cropping situation crop insurance may alter the risks of production (2010). This study expanded upon previous research in order to examine how growing multiple crops and crop insurance policies interact. Utilizing farm data from an Illinois database (similar to the study previously discussed, these can be considered farms “typical” for the

region), Woodard et al. utilized a model of all components of a production situation: yield, county yield, price, government programs, and production costs. In simulating real farms using real farm data, researchers then applied information such as policy availability, premium prices, level of subsidization, and market conditions that were available at the time the farm information was recorded in order to predict responses to insurance under multiple-crop systems.

Woodard et al. concluded that when farmers produce several different crops, as is often the case, the effectiveness decreases when moving from single-cropping, but only under individual products rather than group products, such as GRIP. As a result, they suggest these findings be taken into consideration in future policy work and recommend that multi-cropping regimes be considered in policy studies in the same way that single-cropping is (Woodard et al.).

There are also studies in which researchers suggest that federal crop insurance has a negligible, or negative affect on the overall profitability of producers. The structure of farm-finances and their income allocation provide an opening for price support programs (such as crop insurance) to play a role in “smoothing” out this income in order for producers to better plan for future production (Mishra & Cooper, 2017). In a 2017 study *Impact of farm programs on farm households in the US,* A.K. Mishra and J.C. Cooper examined the effects of multiple farm programs, including crop insurance, on farm households. While Mishra & Cooper used all forms of farm program payments in their research, programs were not consolidated into one value and thus crop insurance is a separately considered. Mishra & Cooper conclude that farm households, on average, would require a $27,000 increase in indemnity payments from this crop

insurance before they would experience less expenditures, which in this study would indicate more money going into savings accounts (2017).

VI. Conclusion

Following their introduction in the mid-1990s, revenue-based crop insurance programs have quickly replaced yield-based programs in the United States, utilized by over 90% of corn and soybean producers (Zulauf et al., 2017). However, it should not have been difficult to predict that these programs would be so popular. With revenue insurance, farmers are protected from losses due to either lower yields or prices, or a combination of the two. Thus, with their now relative ubiquity in the US, there exists a significant amount of literature as to how the revenue-based programs benefit farmers. Overall, farmers generally have benefited from the introduction of these insurance products or they have at least not been to their detriment.

In their 2000 study, Coble et al. found that revenue-based crop insurance can play a supplementary role when compared to market risk management practices such as futures and options hedging. This change is only slight, as the decrease in demand for hedging when revenue-based insurance coverage is available is less than 10%. Wang et al.'s 2002 study on farmers in the pacific northwest also had similar findings regarding the demand for hedging when revenue-based insurance products are in the mix, though their findings also emphasized that the two can (and should) be complementary. A similar theme was found in Gray et al.'s study, in which they simulated returns to land under government programs only and under government programs combined with Crop Revenue Coverage (2004). Under CRC, mean returns to

land to did not increase, while variability of returns decreased, and more farmers experienced positive returns than before, indicating there are some benefits to the program. There is also literature that posits there are no clear benefits to the program, such as Mishra & Cooper (2017) who suggest that higher indemnities are required for producers to truly see benefits of a revenue-based crop insurance program (which would have even farther reaching economic implications). Woodard et al. also suggest that more thorough investigation into the outcomes of real-world crop insurance policies is required, as producers in multi-cropping situations found a decrease in the effectiveness of risk reduction compared with those practicing single cropping, particularly when they utilized individual rather than group polices (Woodard et al., 2010). Other studies such as Coble & Miller (2006) and Claassen et al. (2016) indicate that while producers may not realize any gains selecting revenue-based programs over yield-based programs, there is the genuine possibility of negative externalities, particularly undue moral hazard resulting from farmers engaging in high-risk production (such as on marginal land). Thus, revenue-based crop insurance policies' true effects on producers in the United States may not be fully measurable without further research.

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